ES-SloMoJ

Slow Motion Video Controller

User Manual

JLCooper ELECTRONICS

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Introduction

The ES-SloMoJ is a compact controller for News, Sports, Scoreboard and other slow motion editing operations. It makes the operation of professional video recorders quick and easy.

It's a full-featured 4-machine editor and universal Jog/Shuttle remote for most VTRs and disk based recorders. Its sleek design and low cost make it the perfect addition to edit suites, remote trucks and field production applications.

ES-SloMoJ features include professional transport buttons, professional Jog Wheel and Shuttle Ring for convenient picture search operations, a high quality T-Bar to control Slow Motion effects, an easy to read 2 line by 16 character VFD display for accurate editing, a numeric keypad, fast access function keys and an integrated data and power cable to minimize workspace clutter.

Features

- Simultaneous Control of up to 4 VTRs or DDRs via standard 9 pin (P2) protocol
- Simultaneous Control of up to 16 VTRs or DDRs with the addition of the optional Gangway16 or Gangway32
- 4 RS-422 serial ports (16 with the optional Gangway16 or Gangway32)
- Professional Jog mechanism
- T-Bar control for slow motion control using Shuttle, Jog or Variable Play commands
- Dynamic slow motion replays directly accessed from integrated T-Bar mechanism
- User programmable T-Bar limits
- User programmable T-Bar behavior:
- Min to Max, -Max to +Max, ±5%, ±10%
- Active or Passive T-Bar Modes
- High durability transport buttons
- Full size numeric keypad to enter and recall cue locations and time code
- Easy to read 2 line x 16 VF Display
- Assemble, insert, crash and record lockout modes
- Global record lock
- Machine 1 control lockout
- Mark In and Mark Out keys to quickly store cue points
- Capacity to store 1000 cue points or 400 in and out points with varispeed
- Ability to transfer cues to/from another ES-SloMoJ or computer for backup or editing
- Ability to import/export cues from/to Ash Vale SM-2a
- Programmable cueing modes
- Automatic play All Cues function
- 2 user assignable buttons
- Log operation for QC Applications
- 16 variable replay speeds
- EE/PB switching control
- EJECT function for tape based video devices
- Controls most VTRs and hard disk based systems
- Direct support for Doremi Video Servers
- Direct support for Odetics compatible video servers
- 10 foot (3m) detachable control and power cable with recessed connector to minimize footprint
- AC or DC power, 90~240 volts AC, 50/60 Hz or, 9-12 volts DC

Connecting

Connecting the ES-SloMoJ is straightforward. Connect the large 25 pin D-Sub connector to the rear of the ES-SloMoJ. Secure the connector the ES-SloMoJ by screwing the lock screws into the connector. Connect each video device or video server to the smaller 9 pin D-Sub connectors. Some video servers have more than one connector, which allow simultaneous control of the recorder and player. In these cases, connect each port to its own connector on the ES-SloMoJ.

Lastly, connect the ES-SloMoJ to a source of power. This can be either from the power mains using the provided power supply or directly from 9-12 volts DC. The connector is a 2.1mm coaxial power connector. The center pin is positive. A power switch on the rear panel turns the ES-SloMoJ on or off.

Initialization

The ES-SloMoJ configuration and T-Bar calibration can be reset by holding the SHIFT button while applying power to the ES-SloMoJ. After doing so, the display will show:

```
      Memory
    Initialized
```

Then the display will show:

```
    TBAR NEEDS
    CALIBRATION
```

Follow the directions on the display.

```
    MOVE TO TOP
  AND PRESS ENTER
```

```
   MOVE TO BOTTOM
  AND PRESS ENTER
```

This calibrates the T-Bar for optimum range. These values are stored in nonvolatile memory and should never need to be changed. After performing this, the ES-SloMoJ will revert to normal operation.

Timecode Display

When the ES-SloMoJ displays timecode, it displays more than just the current timecode. The character to the left of the hours field indicates drop frame operation. If the machine returns nondrop frame timecode, the ES-SloMoJ displays a space as shown in the screenshots below.

```
TC= 02:35:52.18
```

Nondrop Timecode display in Instant Replay and Cue and Park Modes

```
186 02:35:52.18
```

Nondrop Timecode display in Cue/Play/Stop and Cue/Play/ StopSlo Modes

If the machine returns drop frame timecode, the ES-SloMoJ displays a period or dot as in the screenshots below.

```
TC= 02:35:52:18
```

Drop Frame Timecode display in Instant Replay and Cue and Park Modes

```
186 02:35:52:18
```

Drop Frame Timecode display in Cue/Play/Stop and Cue/ Play/StopSlo Modes

The character between the seconds and frames numbers indicates field 1 or 2. If the machine returns field 1 in the timecode, the ES-SloMoJ displays a period as in the screenshots below.

```
TC= 02:35:52.18
```

*Timecode display in Instant Replay and Cue and Park
Modes indicating field 1*

```
TC= 02:35:52.18
```

*Timecode display in Cue/Play/Stop and Cue/Play/StopSlo
Modes indicating field 1*

If the machine returns field 2 in the timecode, the ES-SloMoJ displays a colon as in the screenshots below.

```
186 02:35:52:18
```

*Timecode display in Instant Replay and Cue and Park
Modes indicating field 2*

```
TC= 02:35:52:18
```

*Timecode display in Cue/Play/Stop and Cue/Play/StopSlo
Modes indicating field 2*

Some video devices do not return fields so, you may only see one or the other.

Buttons and Controls

The following section introduces the controls on the ES-SloMoJ and details the functions of those controls.

System Functions

Menu

Pressing this button causes the ES-SloMoJ to enter the configuration menu system. The Enter button is used to switch between the menu item and its parameters. Refer to the *Configuration Menu* section for more detail.

This illuminates when the ES-SloMoJ is in configuration mode.

Shift

Holding this button while pressing a second button causes a secondary or shifted function. The best example is the Play button. Holding the Shift button while pressing the Play button causes the ES-SloMoJ to send the Record command. Refer to the *Record Modes* section for more detail.

This illuminates when the video device reports back that it is recording.

Transport Functions

Replay

Note: In earlier versions of the ES-SloMoJ, this button performed the Eject function.

Pressing this button causes the ES-SloMoJ to perform a Replay operation. See the *Instant Replay* section for more detail.

Rewind

Pressing either of these buttons causes the ES-SloMoJ to send the Rewind or Fast Forward command. It's action can be latching or momentary. The default action is latching. This can be configured in the menu.

This illuminates when the video device reports back that it is rewinding.

R-Play

Pressing this button causes the ES-SloMoJ to send a Shuttle Reverse at 1x command.

There is no P2 status message for Reverse Play so this illuminates after the ES-SloMoJ sends the Shuttle Reverse command.

Stop

Pressing this button causes the ES-SloMoJ to send the Stop, Still (Shuttle Forward at 0x) command. It can also be set to send Still on the first button press and Stop on subsequent button presses. The default action is Still, Stop. This can be configured in the menu.

This illuminates when the video device reports back that it is stopped.

Play/Rec

Pressing this button causes the ES-SloMoJ to send the Play command. Alternately, pressing and holding the Shift button while pressing the Play button will cause the ES-SloMoJ to send the Record command. Refer to the *Record Modes* section for more detail.

The Record command can be disabled in the menu. Refer to the *Configuration Menu* section for more detail.

This illuminates when the video device reports back that it is playing or recording.

W1, W2

These are user definable buttons. This can be configured in the menu.

Frame-1, Frame +1

Pressing either of these buttons causes the ES-SloMoJ to move the video device forward or backwards by one frame. The frame rate must be configured or the ES-SloMoJ to properly handle the transition around 00 sec.

Jog Wheel

Turning this wheel causes the ES-SloMoJ to send Jog Forward or Jog Reverse commands to the video device. This can be enabled or disabled by the Jog button described below.

Shuttle Ring

Turning this ring causes the ES-SloMoJ to send Shuttle Forward or Jog Reverse commands to the video device. The LEDs above the Shuttle Ring indicate the shuttle direction. Both LEDs illuminated indicate the the shuttle speed is 0 (still or pause).

Shuttle Select

Pressing this button causes the ES-SloMoJ to disable the Jog Wheel and Shuttle Ring. This prevents the ES-SloMoJ from sending unintended Jog or Shuttle messages when the ES-SloMoJ is accidentally bumped. The LEDs above the Shuttle Ring will extinguish when the Jog Wheel and Shuttle Ring are disabled.

Track Arming Functions

Asm

Pressing this button causes the ES-SloMoJ to command the video device to enable the Assemble Record mode. Not all video devices support this. This is intended for tape based video devices. Pressing this button will disable Insert Mode and disarm all video, audio and timecode tracks. Refer to the *Record Modes* section for more detail.

This illuminates when the video device reports back that Assemble mode is enabled.

Ins

Pressing this button causes the ES-SloMoJ to command the video device to enable the Insert Record mode. Not all video devices support this. This is intended for tape based video devices. Pressing this button will disable Assemble Mode. Refer to the *Record Modes* section for more detail.

This illuminates when the video device reports back that Insert mode is enabled.

V/TC

Pressing this button causes the ES-SloMoJ to command the video device to arm the video track for Insert Recording. Not all video devices support this. This is intended for tape based video devices.

Holding the Shift button while pressing this button causes the ES-SloMoJ to command the video device to arm the timecode track for Insert Recording. Not all video devices support this. This is intended for tape based video devices.

Refer to the *Record Modes* section for more detail.

This illuminates when the video device reports back that Insert mode is enabled and the video track is armed.

A1/A3, A2/A4

Pressing these buttons causes the ES-SloMoJ to command the video device to arm the audio tracks for Insert Recording. Not all video devices support this. This is intended for tape based video devices. Because there are a variety of video devices of the market with various track counts and types (analog/Hi-Fi/digital) you will need to configure the Audio Track Type appropriately. Refer to the *Record Modes* section for more detail.

This illuminates when the video device reports back that Insert mode is enabled and the audio track(s) is/are armed.

T-Bar Functions

T-Bar

Moving this control causes the ES-SloMoJ to send various speed commands to the video device. This can be enabled or disabled by the Enable button described below. Refer to the *T-Bar Operation* section for more detail.

Enable

Pressing this button causes the ES-SloMoJ to enable the T-Bar. Refer to the *T-Bar Operation* section for more detail.

This illuminates when the T-Bar is enabled.

Preset

Pressing this button causes the ES-SloMoJ to send the preset T-Bar speed command. The speed is configured in the configuration menu. Refer to the *T-Bar Operation* section for more detail.

This flashes when the T-Bar is not at the preset speed. When the T-Bar is moved to the preset speed, the button is illuminated solid.

Scaled

Pressing this button causes the ES-SloMoJ to select the scaled speed range of the T-Bar. Refer to the *T-Bar Operation* section for more detail.

This illuminates when the scaled speed range of the T-Bar is enabled.

Machine (1, 2, 3, 4)

This allows any of four video devices to be controlled by the ES-SloMoJ. Simply press any of the 4 buttons to control a video device.

These buttons also allow you to 'gang roll' multiple video devices. To do this, press and hold any of the 4 buttons you wish to control and then press additional buttons while still holding the first button. The timecode and status from the held button is displayed on the ES-SloMoJ.

Refer to the *Machine Control* section for more detail.

Cueing Functions

Manual Time

Pressing this button allows you to enter a specific timecode location and have the video device to to that location, if it is valid and exists.

Simply press the Manual Time button, enter the timecode you wish to locate to using the numbered keypad and press the Enter button.

This illuminates while the ES-SloMoJ is waiting for user input.

Refer to the *Cue Operations* section for more detail.

CLR ESC

Pressing this button causes the ES-SloMoJ to erase and exit the pending Manual Time entry.

Refer to the *Cue Operations* section for more detail.

Mark In / Mark Out

Pressing either of these buttons causes the ES-SloMoJ to temporarily store the current timecode for Instant Replay and Cue/Clip Store functions.

Refer to the *Cue Operations* section for more detail.

Store Cue

Pressing this button causes the ES-SloMoJ to store the current Mark In and Mark Out points for Cue/Clip Store functions.

This illuminates to indicate that the Mark In and Mark Out points have been defined are waiting to be stored. The ES-SloMoJ is waiting for the user to press the Enter or CLR/ESC button.

Refer to the *Cue Operations* section for more detail.

Last Cue, Next Cue

Pressing either of these buttons causes the recall the next or previous stored Cue or Clip. The Cue or Clip is not recalled until the Enter button is pressed.

This illuminates to indicate that the Cue is pending and waiting for the user to press the Enter or CLR/ESC button.

Refer to the *Cue Operations* section for more detail.

Enter

Pressing this button causes the ES-SloMoJ to act on the pending operation.

In Manual Time entry, it causes the SoMo Mini to command the video device to locate to the manually entered timecode, if it is valid and exists.

In Last Cue/Next Cue recall (in Cue and Park mode), it causes the SoMo Mini to command the video device to locate to the stored timecode, if it is valid and exists.

In Last Cue/Next Cue recall (in Cue/Play/Stop or CuePlayStop Slo mode), it causes the SoMo Mini to command the video device to locate to the stored In Point, enter Play or varispeed mode and stop at the stored Out Point.

Refer to the *Cue Operations* section for more detail.

The Enter button is also used in the Configuration Menu to switch between the menu item and the parameters.

Numeric Keypad

Pressing these buttons allow you to directly access Cues and Clips. They also allow you to enter timecode for Manual Time.

Refer to the *Cue Operations* section for more detail.

Configuration Menu

There are a number of user configurable items that should be checked and set for your application.

To go to the menu, press the MENU button. Select the menu item by turning the Jog Wheel.

```
> Time Code Type
  30 Drop
```

As the Jog Wheel is turned, different menu items are displayed on the top line of the window.

There are two types of items accessed this way: Parameters and Commands. Parameters allow the user to modify settings and are stored in nonvolatile memory. Commands allow you to perform certain operations such as a memory dump or clear memory. In the case of parameters, you will see the currently selected and stored value on the bottom line. An arrow of the left side of the display points to the top line, indicating that the menu item is now being selected by the wheel.

Once the desired menu item is shown, a press of the ENTER key will cause the arrow to change to the bottom line of the display.

```
  Time Code Type
> 30 Drop
```

This indicates that turning the Jog Wheel will scroll the possible options for that menu item. Pressing the ENTER key again will return the arrow to the top line, and additional menu items may be scrolled thru. When all options have been set, another push of the MENU button will save them to the nonvolatile memory. If you decide to not save, pressing the CLR/ESC key will exit out of the menu mode without saving.

When commands are reached at the end of the parameters, the arrow symbol no longer appears. The second line will now be an instruction, such as the following:

```
ENTER = Erase
```

In some cases, additional instructions may appear after the pressing of ENTER. Pressing the CLR/ESC key will exit out of the menu operation.

On the following pages are the list of parameters and commands along with all the possible options. The defaults after initialization are shown in **boldface**.

Parameters

1.   Time Code Type

This is only used by the Step Frame (Frame+1 and Frame-1) functions. This determines how the ES-SloMoJ behaves at whole second boundaries.

- 24
- 29.97 drop
- 25
- **30 drop**
- 29.97
- 60
- 30

2.   Record Enable

Allows record and edit functions to be enabled or disabled.
- **Enabled**
- Disabled

3.   T-Bar Range

This sets the speed range of the T-Bar from bottom to top.

Note: Due to limitations of the P2 protocol, these speeds may not be exact.

- **Normal**   Scaling Disabled: Still to 10x
                     Scaling Enabled: T-Bar Speed Min and Max.
- ± 5%   95% to 105% of play speed
- ± 10%   90% to 110% of play speed
- Bidirectional   -1x to +1x play speed

4.   T-Bar Mode

Defines how the T-Bar operates.
- **Passive**
    Movement of an Enabled T-Bar sets the speed, which will be sent upon either pressing the Play button or calling up a Clip or Cue. Actual

command sent would be selected by the "T-Bar Message" below unless set at exactly Play speed, in which case a Play message will be sent.

- Active

  Movement of the T-Bar immediately sends an appropriate command to machine when Enable LED is on.

5. *T-Bar Speed Min*

This sets the minimum speed to be sent by the T-Bar in Normal Mode when the T1 (Scaling) button is active.

Note: Due to limitations of the P2 protocol, these speeds may not be exact.

• **Still**	• 1/16x	• 1/4x
• 1/64x	• 3/32x	• 3/8x
• 1/32x	• 1/8x	• 1/2x
• 3/64x	• 3/16x	• 3/4x

6. *T-Bar Speed Max*

This sets the maximum speed to be sent by the T-Bar in Normal Mode when the T1 (Scaling) button is active.

Note: Due to limitations of the P2 protocol, these speeds may not be exact.

• 1x	• 2x	• 8x
• 1½x	• **4x**	• 10x

7. *T-Bar Speed Preset*

Sets the Preset Speed to be evoked by pressing the Preset Button.

Note: Due to limitations of the P2 protocol, these speeds may not be exact.

• Still	• 1/8 x	• **1x**
• 1/64x	• 3/16x	• 1½x
• 1/32x	• 1/4x	• 2x
• 3/64x	• 3/8x	• 4x
• 1/16x	• 1/2x	
• 3/32x	• 3/4x	

8. *T-Bar Message*

This sets the type of command sent by ES-SloMoJ during T-Bar operations

- Jog Msgs
- Variable Msgs
- **Shuttle Msgs**

9. *Stop --> T-Bar*

This determines if pressing the STOP, PLAY, R-PLAY, REW or FFWD button will disable the T-Bar and turn off ENABLE LED.

- No Effect

• **Turns Off**

10. *Step Frame*

This determines what will happen when a Frame+1 or Frame-1 button is pushed.

• **GoTo Mode**
  This will issue a GoTo to the proper frame. This should be used with most "modern" machines, as it can cause inaccurate locating with older machines such as the BVU-800.

• SloMo Mode
  This issues a slow shuttle command in the appropriate direction, then a Still command when the desired frame has been reached. This does not work well with disk-based recorders.

• Step Fwd/Rev
  This sends a 2x 14 or 2x 24 command that is recognized by only very new machines.

11. *Audio Trk Type*

This determines how the audio track arming is handled.

• Type 1
  Older video devices with two analog tracks.
  A1 = Analog Audio 1 (This is sometimes interpreted as Digital Audio 1 in some video devices)
  A2 = Analog Audio 2 (This is sometimes interpreted as Digital Audio 2 in some video devices)
  Shift + A1 = Analog Audio 3 (TC in some video devices)
  Shift + A2 = Analog Audio 4 (Sync in some video devices)

• **Type 2**
  Sends a 2 byte track arm message with the A1 & A2 bits copied from the D1 & D2 bits. Tally back uses byte 5 of the Status Data message.
  A1 = Analog Audio 1 and Digital Audio 1
  A2 = Analog Audio 2 and Digital Audio 2
  Shift + A1 = Digital Audio 3
  Shift + A2 = Digital Audio 4

• Type 3
  Same as Type 2, except Tally back uses the Edit Preset Sense message.
  A1 = Analog Audio 1 and Digital Audio 1
  A2 = Analog Audio 2 and Digital Audio 2
  Shift + A1 = Digital Audio 3
  Shift + A2 = Digital Audio 4

• Type 4
  Same as Type 2, except the A1 & A2 bits are set to zero.
  A1 = Digital Audio 1
  A2 = Digital Audio 2
  Shift + A1 = Digital Audio 3
  Shift + A2 = Digital Audio 4

12. *Stop Method*

Sets Stop behavior.

- STOP Command
  - A Stop command is sent.
- STILL Command
  - A Shuttle=0 (Still) command is sent.
- **STILL, STOP**
  - The first push will cause a Still command to be sent. The second push will cause a Stop to be sent.

13. FFwd and Rew

Sets Fast Forward and Rewind behavior.

- **Latched**
  - After release of the key, the controlled ES-SloMoJ will remain in selected operation until some other button is pressed.
- Momentary
  - Upon release, either a Stop or Still will be sent, depending on the Stop Method selected above.

14. Trk Data Tally

Allows disabling of this tally, which, under unusual circumstances, might disrupt normal track select operations. If this is disabled, the ES-SloMoJ will not "know" of any track operation done on the controlled ES-SloMoJ itself.

- Disabled
- **Enabled**

15. W1 Button Send
W2 Button Send

Sets the command sent when the W1 and W2 buttons are pressed.

- **Off** (no command sent)
- Preroll Cmd
- Full EE On
- Preview Cmd
- Full EE Off
- Review Cmd
- Select EE On
- Autoedit Cmd
- ½x Play
- Sync Play Cmd
- ½x Rev Play
- Clip Minus
- Clip Plus
- Loop Mode
- Toggle Clip Enable (see "Editing the Cue List" below)
- Change SloMo (see "Editing the Cue List" below)

16. Show Shut Speed

Displays the Shuttle speed when the Shuttle Ring is turned.

- **Disabled**
- Enabled

17. Log Operation

Enables or disables Log Operation. (See Log Operation in appendix)

- **Disabled**
- Enabled

18. *Cue Operation*

This determines how cues are stored and played back and the definition of a cue.

- **Cue and Park**

    Cues are only defined a start time. When a cue is recalled, a CueUp message is sent to ES-SloMoJ and no further action is taken. Cue start times are captured using the Store Cue button. This mode allows 1000 cues.

- Cue/Ply/Stop

    Cues are stored as start and stop times. When a cue is recalled, a CueUp message is sent. When the ES-SloMoJ reports that it is cued, a Play command is issued. When the play time agrees with the stop time, a Stop command is issued. Cues are captured using the Mark In/Out keys, along with the ENTER key. This mode allows 400 cues composed of start and stop times.

- CuePlyStopSlo

    Intended primarily for Sports. Like the operation above, except that when the cue is captured, the present setting of   the T-Bar is saved as a SloMo setting. This may be done without the T-Bar actually affecting the speed of playback at the time the capture takes place. When a cue is recalled, this SloMo speed setting will be used instead of the Play command (unless the current setting of the T-Bar is at Play speed, in which case, a normal Play command is issued). This mode allows 400 cues composed of start and stop times with a speed value.

- Instant Replay

    Note: Instant Replay requires v1.11 or later firmware.

    This allows the ES-SloMoJ to perform instant replay operations with file based video recorders such as the Blackmagic Designs HyperDeck Studio and Aja Ki Pro. In this mode of operation, pressing the Replay button commands the recorder to perform the following:

    - Cue back to a moment of interest,
    - Replay the video at any speed and,
    - Return to the previous operation.

19. *Preroll Time*

Sets the amount of preroll applied to all Goto or locate operations including Cue operations.

- **0 seconds**
- 15 frames
- 1 second
- 2 seconds
- 3 seconds
- 4 seconds
- 5 seconds
- 6 seconds
- 7 seconds
- 8 seconds
- 9 seconds

20. Cue Delay Time

Sets the amount of delay between cues when in Play All Cues operation.

• **0 seconds**	• 5 seconds
• 1 second	• 6 seconds
• 2 seconds	• 7 seconds
• 3 seconds	• 8 seconds
• 4 seconds	• 9 seconds

21. Mach 1 Control

Enables or disables the machine on port 1. This is intended for ES-SloMoJs that have the ability to simultaneously record and playback. This feature allows the operator to start the recorder at the beginning of an event and then locking out the controls to prevent the accidental stopping of the record process.

• Disabled
• **Enabled**

22. Gangway Oper.

Enables or disables control of an optional JLCooper Electronics Gangway16 or Gangway32 RS-422 router. Enabling this option repurposes the 1, 2, 3 & 4 buttons and LEDs below the T-Bar for remote control of the Gangway16 or Gangway32. See the section on Gangway Operation.

• **Disabled**
• Enabled

Commands

23. Ply All Clips

This allows the automatic playback of valid and enabled cues, starting with the currently selected one. When a blank cue is reached, the operation ends. A blank cue is defined as a cue with a stop time = 00:00:00:00, which is the internal condition of erased cues. You must be in Cue/Play/Stop or CuePlyStp Slo modes for this operation to take place! After each cue is played, the controlled ES-SloMoJ will stop for a period set by the Cue Delay Time, and then proceed to the next cue.

• ENTER
   When the ENTER key is pressed to initiate this command, a message appears prompting the operator to place the destination video device into record mode. Press ENTER again to begin the playout of clips.
• W1 or W2
   By selecting the W1 or W2 button to be "Tog Clip Enable", it is possible.
• CLR/ESC
   Pressing the CLR/ESC button at any time aborts the operation.

24. *Ply Odet Clips*

This the same as Play All Cues, except that it uses the Odetics protocol to accomplish the playback. All other description of Play All Cues is valid.

25. *Xmit Cue List*

Pressing the ENTER key causes all non zero cue location data to be sent over port #4 to either another ES-SloMoJ ES-SloMoJ or a computer. When attaching to another ES-SloMoJ ES-SloMoJ, a special RS-422A crossover cable is necessary. When attaching to a computer, as RS-422A port or RS-422A to RS-232 converter is necessary.

When the ES-SloMoJ is in Cue and Park mode, the data format conforms to the Ash Vale SM-2a protocol. When the ES-SloMoJ is in Cue/Ply/Stop or CuePlyStopSloMo mode, the data format is unique to the ES-SloMoJ.

Both formats are detailed in the appendix.

26. *Rcv Cue Dump*

Pressing the ENTER key causes the ES-SloMoJ to prepare itself for reception of a Cue Dump from another ES-SloMoJ or from a computer. Reception is via port #4. The ES-SloMoJ will automatically detect which format is being sent to it. Pressing the CLR/ESC button aborts this operation.

When sending data from a computer, a 25 mS delay must be inserted between each cue to allow the ES-SloMoJ to write to nonvolatile memory. The ES-SloMoJ performs this when it sends data.

27. *Erase All Cues*

In Cue and Park mode, pressing the ENTER key will set all 1000 cue locations to 00:00:00:00, which is considered an erased location.

In Cue/Ply/Stop mode, pressing the ENTER key will set all 400 start and stop times to 00:00:00:00, which is considered an erased location.

In CuePlyStopSlo mode, pressing the ENTER key will set all 400 start and stop times to 00:00:00:00 and set the speed to 00 00, which is considered an erased location.

Initialization

28. *Init for Sports*

Pressing the ENTER key will set up parameters for typical sports slow motion operation.

- Frame rate and type = 30 drop
- Record Enabled
- T-Bar = Normal range
- T-Bar = Passive
- Min T-Bar = Still
- Max T-Bar = Play Speed
- T-Bar Preset = Play Speed
- T-Bar sends Shuttle
- Stop/FF/Rew have no effect on T-Bar Enable
- Step Frame = GoTo
- Type 2 Audio track handling

- Stop button sends Stop
- Latched FF and Rew
- Enabled Track Tally
- W1 toggles Clip Enable
- W2 writes new SloMo speed on current Clip
- Log Function Off
- Cue operation = Cue/Play/Stop with SloMo
- Preroll = 0 sec
- Clip Delay = 0 sec.
- Mach 1 Control = Enabled

29. *Init for Coords*

Pressing the ENTER key will set up parameters for another typical sports slow motion operation.

- Frame rate and type = 30 drop
- Record Enabled
- T-Bar = Normal range
- T-Bar = Passive
- Min T-Bar = Still
- Max T-Bar = Play Speed
- T-Bar Preset = Play Speed
- T-Bar sends Shuttle
- Stop/FF/Rew have no effect on T-Bar Enable
- Step Frame = GoTo

- Type 2 Audio track handling
- Stop button sends Stop
- Momentary FF and Rew
- Enabled Track Tally
- W1 Off
- W2 Off
- Log Function Off
- Cue operation = Cue and Park
- Preroll = 15 frames
- Clip Delay = 0 sec.
- Mach 1 Control = Enabled

T-Bar Operation

The T-Bar may be set via "T-Bar Range" to Normal, ±5%, ±10%, or bidirectional operation.

Note: Due to limitations of the P2 protocol, these speeds may not be exact.

Normal

There are three main aspects of the "Normal" speed operation of the T-Bar, as follows:

Full Range Operation

Press the ENABLE button. As soon as the T-Bar is moved, a speed command (depending on message choice made in the Menu) will be sent. The range of operation is from Still (all the way toward the operator) to 10x normal play speed.
A subsequent press of the ENABLE button will turn the T-Bar off. Depending on selection within the Menu, the pressing of any "transport" button (REW, R-PLAY, STOP, PLAY, FFWD) may be made to turn the T-Bar off.

Scaled Range Operation

Press the T1 button. The T-Bar will be enabled. The Minimum speed of the T Bar will now be the value set in the Menu Item T-Bar Speed Min. The Maximum speed will now be the value set in the Menu Item T-Bar Speed Max.

Preset Operation

It might be desired to be able to always start T Bar operation at a know speed different from the Max or Min value. When the PRESET button is pushed, a speed value equal to the speed set in the Menu Item "T-Bar Speed Preset" will be immediately sent. That speed will be shown on the second line of the display. Unless the T-Bar happens to be sitting at the Preset speed, the PRESET LED will blink indicating that the T Bar needs to be moved to the "null" point (the point where the T Bar position is the same as the Preset).

On the far right of the display, an up or down arrow will show which direction the T Bar needs to be moved. When the T-Bar is moved past the Preset point, the LED will turn off, and the arrow will disappear. The T Bar is now "Live".

When the ENABLE LED is off, movement of the T Bar will display (for about 1/2 second) the speed that would be sent were the T Bar enabled. This includes any min/max scaling if the T1 LED is lit. By this means, the operator can go to an exact speed position at any time without causing the controlled machine to move.

±5% Play Range

With this range, the Preset and Range buttons do nothing. The range of the T-Bar is from about 95% of normal play speed to about 105%.

±10% Play Range

With this range, the Preset and Range buttons do nothing. The range of the T-Bar is from about 90% of normal play speed to about 110%.

Bidirectional

With this range, the Preset and Range buttons do nothing. The range of the T-Bar is from 100% reverse play speed to 100% forward play speed.

Cue Operations

There is nonvolatile storage on the ES-SloMoJ for 1000 cues or 400 clips. These are numbered 000 – 999 or 000 - 399. The various operations involving cues are as follows:

Basic Cue Operations

To Goto a Predefined Cue

1. Enter the 1,2 or 3 digit number: the time will show on line #2 of the display, while the entry is shown on line #1.

2. Press Enter. A locate command will be issued, and the top line will revert to showing current time.

    Note: If Preroll is enabled, that will be applied to time.

3. The next action will depend upon the Cue Operation mode that the ES-SloMoJ is configured for.

    • If in Cue and Stop mode, the controller does nothing.

    • If in Cue/Ply/Stop mode, the controller will send a Play command when Mark In point is reached (minus any Preroll), and will send a Stop command when the Mark Out point is reached.

    • If in CuePlyStopSlo mode, the controller will send a Variable Play command when Mark In point is reached (minus any Preroll), and will send a Stop command when the Mark Out point is reached.

4. Pressing the CLR/ESC button will exit the cue entering process, but will allow the entered cue to remain "pending" for possible Cue/Ply/Stop time capture operation.

Next Cue

Pressing this will bring up the next higher cue from the last entered or used. The time stored in this Cue location will be displayed on the second line. Multiple presses of this will scroll thru the Cues.

    • Pressing Enter will cause the currently displayed Cue to be sent.

    • Pressing the CLR/ESC button will exit back to normal operation without sending the Cue.

Last Cue

This operates the same as above, except that the Cue number is decremented with each push.

Current Cue

Pressing the ENTER key will replay the most recently selected cue. This may be done repeatedly.

"Cue and Park" Specific Operations

To Manually Enter a Goto Time

1. Press ManTime button. The display will show:

```
Enter Time
--:--:--:--
```

2. Start pressing numbers: they will scroll from right to left across screen. At any time, a first press of the CLR/ESC button will clear whatever entry is being made to all zeros. A second push of the button will exit the operation.

3. When the desired time is displayed, press Enter. The GoTo command will be issued and the top line will revert to showing current time.

   Note: If Preroll enabled, that will be applied to time.

To store Current Time to a Cue

1. Press StoreCue. If no manual entry of time has been made, the Current Time will transfer to bottom line and the following will appear on top line.

```
Store Cue# ---
  00:00:00:00
```

2. Enter a 1, 2 or 3 digit number.

3. Press Enter. Current time will be stored, and display will revert. No Goto will be sent.

To store a manually entered time to a Cue

1. Press ManTime button. The display will show:

```
Enter Time
--:--:--:--
```

2. Start pressing numbers: they will scroll from right to left across the screen.

3. When desired time entered, press StoreCue. The display will show:

```
Store Cue# ---
```

4. Enter a 1, 2 or 3 digit number.

5. Press Enter. The entered time will be stored, and the display will revert. No Goto will be sent.

To copy a time from one Cue to another

1. Enter a 1 or 2 digit Cue number. The associated time will be shown on the second line.

2. Press StoreCue. The display will show:

```
Store Cue# ---
```

3. Enter a 1, 2 or 3 digit number.

4. Press Enter. The entered time will be stored, and the display will revert. No Goto will be sent.

"Cue/Ply/Stop" and "CuePlyStp Slo" Specific Operations

Saving a Cue with Start and Stop times

1. Insure that in either Cue/Ply/Stop or CuePlyStp Slo mode.

2. Select a starting Cue number by entering the number on the keypad, then pressing CLR/ESC. The number will show as the leftmost three digits on the top line.

3. At desired Start point, press Mark In. An asterisk appears to the right of the cue number. This may take place with ES-SloMoJ playing at any speed or stopped.

4. At desired Stop point, press Mark Out. Again, this may take place with ES-SloMoJ playing at any speed or stopped. The Store Cue LED will light, and the current time will freeze on the display.

5. If planning to have the automatic SloMo speed captured, you can at this point move the T-Bar to a desired speed, which will be displayed on the second line. If the ENABLE LED is off, this may be done without affecting the playback that may be going on.

6. Press the ENTER key. The Start and Stop times, along with the SloMo speed will be saved to the currently displayed storage location, then the Cue number will auto-increment.

7. Repeat steps 3 thru 6. Each time, the Cue number will increment to the next.

Playing back a Cue/Ply/Stop or CuePlyStp Slo Cue

1. Make sure in correct mode.

2. Enter the desired Cue number on the numeric keypad.

3. Press ENTER.

4. Controlled ES-SloMoJ will be directed to cue to the Start time minus any preroll time. Once there, either a Play or a SloMo command will be issued. The exact command sent is the one set in the T-Bar Message Menu item.

When the ES-SloMoJ has reached the prestored Stop point, a Stop command is issued.

Editing the Cue List

It is possible to step thru the list of Cues and Enable or Disable them individually for inclusion in the "Play all Clips" playback.

1. Set the W1 or W2 button for Toggle Clip Enable.

2. As you step thru the clips using the Next, Last, or numerical input, the selected W1 or W2 button's LED will light if a clip is enabled. Pressing the button toggles the condition.

    It is possible to change the SloMo speed that a CuePlyStp Slo Clip plays back. This will take effect on individual recalls of a Clip or on the Play all Clips" operation.

3. Program the W1 or W2 button for "Change SloMo" operations.

4. With the T-Bar Enabled, recall a Clip.

5. Move the T-Bar to a desired speed (optional at this point).

6. Recall a clip. While playing, you may move the T-Bar to desired speed.

7. When set to desired speed, press the W1 or W2 button programmed in step 3 above. The new speed will now be written to the current clip.

Instant Replay

Note: Instant Replay requires v1.11 or later firmware.

When the ES-SloMoJ is used with file based video recorders, the ES-SloMoJ can perform instant replay of the video within the limitations of the video recorder.

Typically traditional Instant Replay requires that the video device be able to simultaneously record incoming video while the video device plays back the video of interest. Unfortunately, most low cost file based video recorders cannot simultaneously play and record. These ES-SloMoJs can only play OR record. Fortunately, the ES-SloMoJ can perform the instant replay function within this limitation.

Most low cost file based video recorders cannot record video while they are replaying video. This is a limitation of the video hardware, not the ES-SloMoJ.

How Instant Replay Works

When the Replay button is pressed the following occurs:

- The ES-SloMoJ commands the video recorder to stop its current operation.
- The ES-SloMoJ commands the recorder to cue back to a defined moment of interest.
- When the recorder is at the moment of interest, the ES-SloMoJ commands the recorder to replay the video at a speed defined by the T-Bar.
- When the recorder reaches the end of the video of interest, the ES-SloMoJ commands the recorder to resume the operation it was previously performing. If the video recorder was previously recording video, the ES-SloMoJ will command the recorder to start recording. Typically, this will cause a new file to be created.

Types of Instant Replay

To accommodate various production workflows, the ES-SloMoJ allows three ways to initiate the Instant Replay function.

- In Out Replay
  This is a traditional, three button replay. It uses the Mark In button to define the start of the video segment and the Mark Out button to define the end of the video segment.

- Deferred Replay
  This is a simpler, two button replay. It uses the Mark Out button to define the end of the video segment. The Mark In point is calculated from the Mark Out point (Mark In = Mark Out - Preroll value).

- EZ Replay
  This is an easy one touch replay. It uses the current timecode when the Replay button is pressed to define the start and end of the video segment. The Mark In point is calculated from the current timecode (Mark In = current timecode - Preroll value). The Mark Out point is calculated from the current timecode (Mark Out = current timecode).

How Instant Replay Controls the Video Recorder

When the Replay button is pressed, the ES-SloMoJ will perform the following:

1. Stop the recording or playback,

2. Cue up to a spot defined by the Mark In minus the Preroll value,

3. Playback the video at a speed defined by the T-Bar,

4. Resume record or playback when the recorder reaches the Mark Out point. If the video recorder was previously recording video, the ES-SloMoJ will command the recorder to start recording. Typically, this will cause a new file to be created.

Please keep in mind that the video recorder must stop recording video to playback video. This is a limitation of the video recorder, not the ES-SloMoJ.

Configuring a Video Recorder for Instant Replay

The ES-SloMoJ can perform the Instant Replay function with many of the popular file based recorders currently available. However, to insure success, there are certain setting that need to be configured for the Instant Replay feature to work properly. Typically, this has to do with properly setting the recording of timecode.

Blackmagic Design HyperDeck Series

This includes the HyperDeck Studio, HyperDeck Studio Pro and HyperDeck Studio 12G.

For the HyperDeck to respond to the ES-SloMoJ, the Remote (REM) button on the HyperDeck must be enabled (illuminated).

For the HyperDeck to correctly locate to the proper location, all the timecode recorded on the the HyperDeck must be unique. Fortunately, this can be done by the HyperDeck.

1. On the front panel of the HyperDeck, press Display, Timecode, Timecode Set. Select the Last Clip option.

Aja Ki Pro Series

This includes the Ki Pro, Ki Pro Rack and Ki Pro Quad.

For the Ki Pro to respond to the ES-SloMoJ, RS-422 Remote Control on the Ki Pro must be enabled.

1. On the front panel of the Ki Pro, press the CONFIG button.

2. Use the SELECT buttons to scroll to configuration item `35.2 Remote Control.`

3. Use the ADJUST buttons to select `RS422 Only.`

4. Press the CONFIG button to exit.

For the Ki Pro to correctly locate to the proper location, all the timecode recorded on the the Ki Pro must be unique. Fortunately, this can be done by the Ki Pro.

1. On the front panel of the Ki Pro, press the CONFIG button.

2. Use the SELECT buttons to scroll to configuration item `8.0 TC In.`

3. Use the ADJUST buttons to select `Time Of Day.`

4. Press the CONFIG button to exit.

VideoDevices PIX Series

This includes the PIX-270i, PIX-260i and PIX-250i.

For the PIX recorders to respond to the ES-SloMoJ, RS-422 Remote Control on the PIX recorders must be enabled.

1. On the front panel of the PIX recorder, press the MENU button.

2. Use the encoder knob to scroll to configuration item
    `7 Remote Control.`
    Press the encoder knob.

3. Use the encoder knob to scroll to configuration item
    `1 RS422.`
    Press the encoder knob

4. Use the encoder knob to scroll to select value
    `On.`
    Press the encoder knob.

5. Press the MENU button to exit.

For the PIX recorders to correctly locate to the proper location, all the timecode recorded on the the PIX recorders must be unique. Fortunately, this can be done by the PIX recorders.

1. On the front panel of the PIX recorder, press the MENU button.

2. Use the encoder knob to scroll to configuration item
    `4 Timecode/Sync.`
    Press the encoder knob.

3. Use the encoder knob to scroll to configuration item
    `3 Timecode Mode.`
    Press the encoder knob

4. Use the encoder knob to scroll to select value
    `Freerun,`
    `Freerun Auto Mute,`
    `Record Run,`
    `24h Run` or,
    `24h Run Auto Mute.`
    Press the encoder knob.

5. Press the MENU button to exit.

Record Modes

The ES-SloMoJ includes buttons dedicated to adjusting the Edit Preset status of a target machine. The main modes are:

Crash Recording

Insure that neither the INS nor ASM LEDs are on. Holding down the Shift button, then pushing the PLAY button will place the machine(s) in the Crash Record mode.

Assemble Recording

Toggle the ASM button so that it is on. Holding down the Rec/Shift button, then pushing the PLAY button will place the machine(s) in the Assemble Record (Edit) mode.

Insert Recording

Toggle the Ins button so that it is on. In addition, press the desired tracks so that they are on. Immediately available are the Video, A1 and A2 tracks. When the Rec/Shift is pushed, the A1 and A2 buttons/LEDs become the D3 and D4 toggles. Holding down the Rec/Shift button, then pushing the PLAY button will place the machine(s) into the Insert Record (Edit) mode. If no Video or Audio track is enabled, only the Play command will be sent.

To exit any of the modes while the video device in motion, simply press the Stop button.

The exact command sent will depend on the `Audio Trk Type` menu item.

Machine Control

Any combination of four machines may be controlled by the ES-SloMoJ. The four buttons labeled "Machine Control" indicate and modify the machines that will receive commands. Pressing a single button will switch both the output of the ES-SloMoJ and the tally back to it to the selected machine. If more than one button are held down, all ES-SloMoJs will receive commands from the ES-SloMoJ. In this case, the first one pushed will become the machine used for Tally operations (current time code, transport control LEDs, and Edit Presets.)   In a multi-machine operation, the selection of tally machine made during the output select process may be overridden by holding down the Rec/Shift button, then selecting a machine. As soon as the Rec/Shift button is held, the current tally machine will be displayed.

Upon power-up, the ES-SloMoJ will always start with machine #1 selected unless the menu item Mach 1 Control is set to Disabled. In that case, the ES-SloMoJ will start up with machine #2 selected.
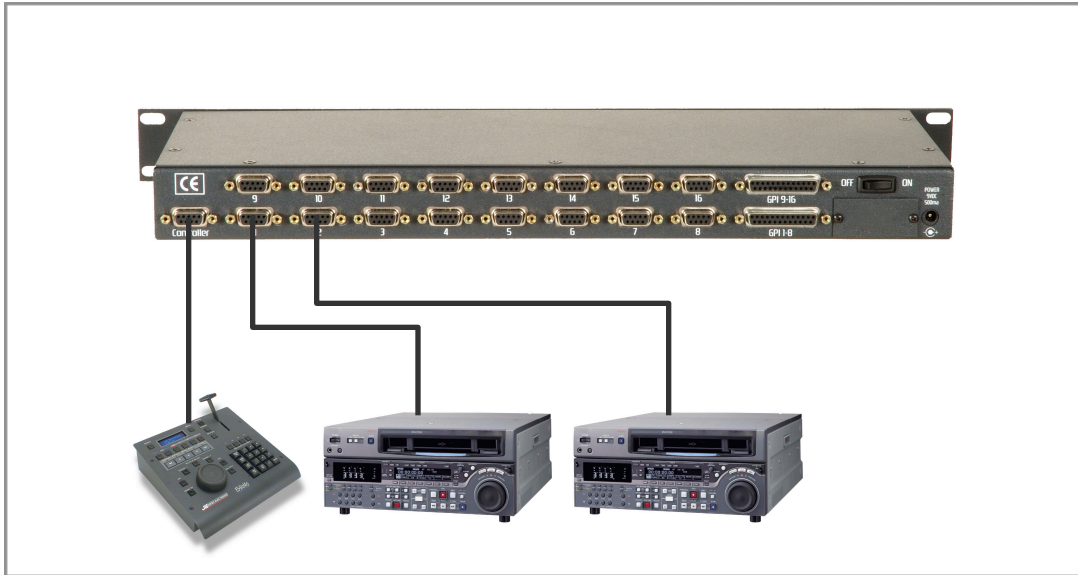
Gangway16 or Gangway32 Operation

When Gangway16 or Gangway32 Operation is enabled in the menu, the ES-SloMoJ is able to remotely control the Gangway16 or Gangway32.

Setup

To use the Gangway16 or Gangway32 with the ES-SloMoJ:

1. Connect port 1 of the ES-SloMoJ to the rear panel controller port of the Gangway16 or Gangway32 as shown below.

2. Enable Gangway Operation in the ES-SloMoJ menu as shown below.

   - To go to the menu, press the MENU button. Select the menu item by turning the Jog Wheel.

   - As the Jog Wheel is turned, different menu items are displayed on the top line of the window.

```
> Time Code Type
   30 drop
```

   - Scroll to the menu item for Gangway Oper.

```
> Gangway Oper.
   Disabled
```

   - When the menu item Gangway Oper. is selected, press the ENTER button to move the cursor to the bottom line.

> Gangway Oper.
  Enabled

- Turn the Jog Wheel so that the value is set to Enabled.
- Press MENU to exit the menu.

Gangway16 or Gangway32 Controls

When Gangway Operation is enabled in the menu, the Machine Control buttons and LEDs are repurposed to control the Gangway16 or Gangway32 (Ports 1-16 only). In this case, the functions of the buttons and LEDs are as follows:

ENABLE ALL   ALL   TALLY
        ON   OFF
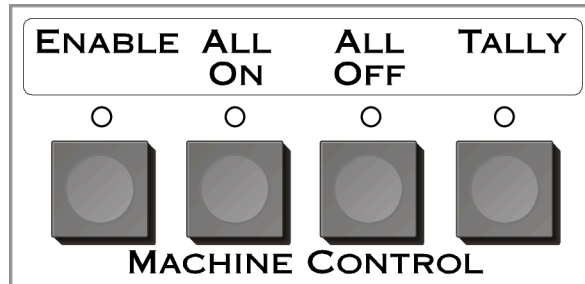
MACHINE CONTROL

Labeling

Since the default labeling of these four buttons is for the Machine Control function, a plastic decal (shown below) is supplied with the unit that allows the labeling of the buttons with the Gangway functions. If desired, this decal can be applied the ES-SloMo above the four Machine Control as shown above to clarify the operation of these buttons and LEDs.

ENABLE ALL   ALL   TALLY
        ON   OFF

Enable

Pressing this button enters the Gangway16 or Gangway32 configuration mode. In this mode, the Enable LED will illuminate and the VFD will show the Gangway16 or Gangway32 routing.

All On

When this button is pressed, the Gangway is configured to enable all 16 ports.

All Off

When this button is pressed, the Gangway is configured to disable all 16 ports.

Tally

Pressing this button allows you to select the port, which provides Tally information (timecode, status) to the ES-SloMoJ. In this mode, the Tally LED will illuminate and the VFD will show the Gangway16 or Gangway32 Tally routing.

Controlling the Gangway16 or Gangway32

To control the Gangway16 or Gangway32, simply press the Enable button. The Enable LED will illuminate and the display will show similar to the screen shot below.

```
1234567890123456
↑
```

The top line indicates the ports of the Gangway16 or Gangway32, 1 = Port 1, 2 = Port 2 and so on. Starting with 10, only the last digit is shown due to space constraints.
In this case, 0 = Port 10, 1 = Port 11 and so on.

```
1234567890123456
↑
```

The bottom line indicates which ports are enabled. The presence of an arrow pointing up indicates that a port is enabled for output. While the absence of an arrow indicates the port is not enabled for output.

To enable or disable a port on the Gangway, make sure that the Enabled LED is illuminated then, key in the two digit entry on the numeric keypad for the port. For example, to toggle the state of Port 6, press 0, 6. The display will be similar to the screen shot below. In addition, the Gangway16 or Gangway32 will illuminate buttons 1 and 6.

```
1234567890123456
↑         ↑
```

This indicates that Ports 1 and 6 are enabled for output that is, commands from the ES-SloMoJ will be sent to video devices connected to Ports 1 & 6.

Similarly, to disable Port 1 in the above example, press 0, 1. The display will show similar to the screen shot below and the Gangway will now only illuminate button 6.

```
1234567890123456
       ↑
```

To enable Port 12 in the above example, press 1, 2. The display will show similar to the screen shot below.

```
1234567890123456
  ↑         ↑
```

To enable all the ports on the Gangway16 or Gangway32 for output, press the All On button. The display will show:

```
1234567890123456
↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
```
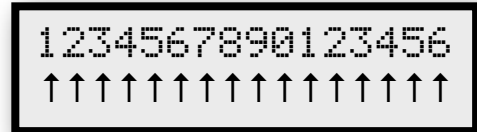
To disable all the ports on the Gangway16 or Gangway32 for output, press the All Off button. The display will show:

```
1234567890123456
```

To receive data (such as Timecode or Status) back from the video device, a port for Tally operation must be selected. This can be done by pressing the Tally button. Pressing

```
1234567890123456
↓
```

Tally will illuminate the Tally LED and cause the display to show the following:

The down pointing arrow will indicate the port that is configured as the Tally port or the port that the ES-SloMoJ listens to for Timecode and Status responses.

As with the Enable function, to enable a port on the Gangway for Tally, make sure that the Tally LED is illuminated then, key in the 2 digit entry on the numeric keypad for the port. For example, to select Port 9 for Tally, press 0, 9. The display will be similar to the screen shot below.

To remove the Gangway16 or Gangway32 configuration pages, simply press the Enable button. This will cause the display to revert to normal operation.

```
1234567890123456
        ↓
```

Appendix

Log Operation

When doing QC work with films or tapes, an operator must look for flaws, and log the type of flaw and time code, often by hand.

The ES-SloMoJ includes a mode to help automate this task. When in this mode (accessed thru the Menu Item "Log Operation",) Machine #4's output is used to send a special command upon the operator's pushing of one of the buttons immediately below the display. This command will be in the form:

```
74h bb ff mm ss hh cs
```

Where:

> `bb` is button # from 0 to 5. This is intended to be an indication of the type of flaw found by the operator and is entirely definable by the user.

> `ff mm ss hh` is the timecode as returned from the machine immediately preceding the button press. It is in BCD format.

> `cs` is checksum of all the bytes in the packet preceding it. The checksum is truncated to the least significant 8 bits.

The data transmission from the ES-SloMoJ follows the standard P2 specification. EIA RS-422A at 38400 bits/sec, 8 data bits, 1 stop bit and odd parity. The user will need to (usually) provide a RS-422 to RS-232 or USB converter, and will need to provide a simple application that receives this data and presents it in a useful format. JLCooper may provide this software at some point in the future, depending on demand. Contact the factory for details.

For details on how to connect your ES-SloMoJ to a computer, refer to the pinout section.

Clip Transfer Protocol

The ES-SloMoJ can transfer cue information in one of two protocols:

- Ash Vale SM-2a
- ES-SloMoJ

The SM-2a protocol is:

The port settings are: 38400 bits/sec, no parity, 8 data bits, 1 stop bit.

The data format is

```
0Dh 0Ah <Cue#> 20h <Time>

            :

0Dh 0Ah <Cue#> 20h <Time>

    0Dh 0Ah @
```

The ES-SloMoJ protocol is:

The port settings are: 38400 bits/sec, no parity, 8 data bits, 1 stop bit.

The data format is

```
0Dh 0Dh 0Ah <Cue#> 20h <StartTime> 20h <EndTime> 20h
                    <n1> <n0>

                       :

0Dh 0Dh 0Ah <Cue#> 20h <StartTime> 20h <EndTime> 20h
                    <n1> <n0>

              0Dh 0Dh 0Ah @
```

Where:

> Cue# is a three digit ASCII value (000 to 999 or 000 to 399) that specifies the cue location.

> Time, StartTime and EndTime are 11 digit ASCII values that specifies timecode values in the following format:

```
hh:mm:ss:ff
```

> **n1** and **n0** define play speed for the clip in CuePlyStop Slo mode. The actual play speed is can be determined by the following equation.

$$TapeSpeed = 10^{\left(\frac{n_1}{32}-2\right)} + \frac{n_0}{256} \times \left(10^{\left(\frac{n_1+1}{32}-2\right)} - 10^{\left(\frac{n_1}{32}-2\right)}\right)$$

> These are the same values sent from the ES-SloMoJ to a machine and are defined on page 17 of the Sony document *Protocol of Remote (9-pin) Connector 2nd Edition.*

> The '@' character terminates the sending of cue data.

When sending data from a computer, a 30 mS delay must be inserted between each cue to allow the ES-SloMoJ to write to nonvolatile memory. The ES-SloMoJ performs this when it sends data.

For details on how to connect two ES-SloMoJ controllers together or to connect your ES-SloMoJ to a computer, refer to the pinout section.

Pinout

ES-SloMoJ to Video Device

The table below details the pinout of the cable included with the ES-SloMoJ.

ES-SloMoJ Function	Machine 1	Machine 2	Machine 3	Machine 4	Ports 1,2,3,4
Ground	21	11	16	6	1
Receive A	22	25	17	20	2
Transmit B	10	12	5	7	3
Receive B	9	13	4	8	7
Transmit A	23	24	18	19	8

Note: Some video devices do not use pin 1 for ground so you may have to connect pin 1 at each end of the ES-SloMoJ cable to pins 4 and 6 on your video device.

The data transmission from the ES-SloMoJ follows the standard P2 specification. EIA RS-422A at 38400 bits/sec, 8 data bits, 1 stop bit and odd parity.

ES-SloMoJ to ES-SloMoJ / ES-SloMoJ to Computer

To connect two ES-SloMoJ controllers together, an RS-422A crossover adapter or cable will be needed. An adapter is available from JLCooper Electronics by ordering p/n 620026. An RS-422A crossover cable can be made by using the following pinout:

These are tied together	1 4 6 9	1 4 6 9	These are tied together
	2	8	
	3	7	
	7	3	
	8	2	

Note: pins 1, 4, 6 and 9 are grounds and are connected together at each end.

Power

The ES-SloMoJ requires a 9-12 volt DC power supply capable of delivering 500 milliamps or more. This can be either from the power mains using the provided power supply or directly from 9-12 volts DC. The connector is a 2.1mm coaxial power connector. The center pin is positive. A power switch on the rear panel turns the ES-SloMoJ on or off.

The ES-SloMoJ comes with a power supply appropriate for the country in which the ES-SloMoJ was sold. If you need a power supply specific to your location, please contact your local distributor or JLCooper Electronics.

Warning: Using a power supply other than the ES-SloMoJ specified could result in damage to the ES-SloMoJ and/or other equipment, which is not covered by the JLCooper Factory Warranty

Location	JLC P/N
North America	PSDC117
Europe (except UK)	PSDC230
Japan	PSDC117
Elsewhere	Call

JLCooper Approved Power Supplies

Caring For Your ES-SloMoJ

If properly cared for, your ES-SloMoJ should provide years of trouble free performance. While the ES-SloMoJ is built in a rugged metal enclosure, please avoid dropping the ES-SloMoJ.

Clean with a soft, damp cloth. Do not allow liquids, dust or other foreign matter to get inside the ES-SloMoJ.

Service

There are no user-serviceable parts in the ES-SloMoJ. Please refer to the JLCooper Electronics Limited Factory Warranty on the following page for detailed warranty and service information.

Troubleshooting

If for some reason the ES-SloMoJ does not give you the expected results, take a moment to do some investigating. The most important concept is that you have your ES-SloMoJ connected properly as outlined in Installation and Use. Take a moment to double check your setup.

A common problem is forgetting to turn the power switch on or turning the ES-SloMoJ on after the software application has launched.

In addition, the JLCooper website (www.jlcooper.com) will contain up to date information on drivers, applications and troubleshooting.

If all else fails, you can contact the JLCooper Service Department at: service@jlcooper.com.

JLCooper Electronics Limited Warranty

JLCooper Electronics ("JLCooper") warrants this product to be free of defects in materials or workmanship for a period of 12 months from the date of purchase. This warranty is non-transferable and the benefits apply only to the original owner. Proof of purchase in the form of an itemized sales receipt is required for warranty coverage. To receive service under this warranty, customers in the United States should contact the JLCooper factory at (310) 322-9990 and talk to a service technician. If necessary, a Return Authorization number may be issued. For our customers outside the United States, it is recommended that you first contact your Dealer or Distributor, since they may offer their own service or support policy. If local support is not obtainable, please send a FAX to JLCooper's Service Department at +1 310 335 0110 with a detailed description of the service required. Upon issuance of return authorization, the product should be packed in the original shipping materials and shipped prepaid and insured to: Service Department, JLCooper Electronics, 142 Arena Street, El Segundo, CA 90245. Please include the following: copy of the sales receipt, your name and address (no P.O. Boxes, please), a brief description of the problem, and any other related items discussed with the service department and considered necessary to evaluate the product or effect a repair. The return authorization number must be clearly written on the outside of the package. JLCooper will, at its option, without charge for parts or labor, either repair or replace the defective part(s) or unit. Shipping costs, duties, customs, brokerage and other fees to and from JLCooper are not covered by this warranty. JLCooper's normal repair turn around time at the factory is approximately 10 business days from receipt of product to shipping. Your actual turn around time will include return shipping. Actual turn around time will vary depending upon many factors including the repeatability of the customer's reported complaint, the availability of parts required for repair, the availability of related products needed to evaluate the product if necessary. Priority services are available at additional cost. These should be discussed with the service representative at the time the return authorization is issued. This warranty provides only the benefits specified and does not cover damage, defects or repairs needed as result of acts beyond the control of JLCooper including but not limited to: abuse, damage by accident or negligence, damage from using incorrect power supply, modification, alteration, improper or abnormal use, unauthorized servicing, tampering, ingress of foreign matter or failure to operate in accordance with the procedures outlined in the owner's manual; nor for natural or man-made events such as, but not limited to flooding, lightning, tornadoes, earthquake, fire, civil unrest, war, terrorism, etc.

THE DURATION OF ANY OTHER WARRANTIES, WHETHER IMPLIED OR EXPRESS, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN. JLCOOPER HEREBY EXCLUDES INCIDENTAL AND CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO: LOSS OF TIME, INCONVENIENCE, DELAY IN PERFORMANCE OF THIS WARRANTY, THE LOSS OF USE OF THE PRODUCT OR COMMERCIAL LOSS, AND FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY APPLICABLE TO THIS PRODUCT. JLCOOPER SHALL NOT BE LIABLE FOR DAMAGES OR LOSS RESULTING FROM THE NEGLIGENT OR INTENTIONAL ACTS OF THE SHIPPER OR HIS CONTRACT AFFILIATES. THIS WARRANTY SHALL BE GOVERNED BY THE LAWS OF THE STATE OF CALIFORNIA.